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INTERNATIONAL BIODETERIORATION BULLETIN

BIODETERIORATION CENTRE
UNIVERSITY OF ASTON
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SALTLEY, BIRMINGHAM B8 3TE.

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The Editors are able to call upon the assistance of an Editorial Board whose members are in Britain, various countries of Europe, and the U.S.A.

NOTES FOR CONTRIBUTORS

The *International Biodeterioration Bulletin* is published four times per year (Spring, Summer, Autumn and Winter). Typescript contributions should be sent to the Editors, at the above address.

The *Bulletin* acts as a vehicle for the publication of original works, incuding reviews, on all aspects of biodeterioration, i.e., deterioration of materials, artefacts or facilities, of economic importance by living organisms, which include microorganisms, insects, rodents, birds, higher plants, etc. Articles on biodegradation, that is conversion of materials to less objectionable, more easily disposable, or higher value products by living organisms, are also published.

Contributions are published only in English. Each article must be accompanied by a summary in 50 - 150 words which will be translated into French, German and Spanish. Native speakers of these languages are invited to submit their summaries in their own language; in certain circumstances complete articles may be submitted in French, German or Spanish and will be translated into English for publication.

Illustrations must be very clearly drawn, normally larger than the size finally desired. The suggested final size should be clearly indicated but the the Editors reserve the right to vary this in the interest of economy and clarity.

As far as possible diagrams will be reduced to single column width (80 mm) or to half page (170 mm). In any event, neither these nor half tone photographs can exceed full page (260 by 170 mm). Authors should bear in mind that it is generally more convenient for readers if legends which accompany diagrams or photographs appear with them on the same page and should proportion their illustrations accordingly. Lettering on diagrams will normally be inserted by the printer; authors are therefore asked to insert lettering or symbols in pencil on the originals or preferably, in ink on a photocopy.

All articles are submitted by the Editors to one or more independent referees for advice on their clarity, originality, and general suitability for publication, but the final decision whether or not to publish an article rests with the editors. If articles are rejected the substance of the referee's report will usually be communicated to the author and in suitable cases the Editors will be pleased to help suthors to improve their papers with a view to possible publication.

Bibliographic references are indicated in the text by author names (no initials) and year only, viz: Reese and Levinson (1952); or: Darby *et al.*, (1968) and in the bibliography in strict alphabetical order of first author's names, thus:

> Reese E T and Levinson H G (1952)
> Comparative study of the breakdown of cellulose by microorganisms
> Physiologica Plantarum 5: 354-366

or:

> Darby R.T. Simmons E G and Wiley B J (1968)
> A survey of fungi in a military aircraft fuel supply system.
> International Biodeterioration Bulletin (1) 39–41

References to books, conference proceedings, etc. should quote first the author(s) or editor(s), then the year of publication and title followed by the city in which it is published and the name of the publisher. As far as possible titles of journals should be given in full except for such abbreviations as 'Journ'., 'Proc'., 'Trans.' etc. 20 reprints will be sent free of charge to the first named author unless otherwise instructed. Any number (normally not more than 50) of additional reprints may be purchased it ordered sufficiently in advance. An order form and price will be sent giving about one month's notice.

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BIODETERIORATION SOCIETY NEWSLETTER

ummer Meeting and A.G.M.

he annual summer meeting will be held at ortsmouth Polytechnic on July 8th and 9th 1982. The ıbject of the main symposium will be:

imber Deterioration and its Prevention

he Annual General Meeting of the Society will be eld in connection with this meeting at 9 am on Friday th July.

nother important event will be the first session of resentations for the award of the Bunker Memorial rize. This is timed for 4 pm on Thursday 8th July.

Wood Preservation Group to meet in Australia

The 'I.R.G.' (International Research Group in Wood Preservation) is to hold its 14th Annual Meeting in May 1983 in Australia. The meeting will be held during the week 9 - 13th May and will be followed by a technical-cum-sightseeing tour down the east coast from Surfer's paradise to Melbourne. Chairman of the organising committee is Dr. Harry Greaves of the C.S.I.R.O. Division of Building Research, Graham Road, Highett, Vic. 3190. The Secretary General of I.R.G. is Mr. Ron Cockcroft whose office is at:

Drottinig Kristinas väg 47 C
S - 114 28 Stockholm, Sweden

Abstracts of papers presented at
a
Symposium on
Modern Methods for Detecting Microbial Spoilage
held at Long Ashton Research Station, University of Bristol
on
15 - 16 April 1982

Title: A New Look at Older Methods

Author: R.R. Davenport

Address: Long Ashton Research Station
University of Bristol
Long Ashton, BRISTOL BS18 9AF

Abstract

The advance of technology has influenced some trends n microbiological methods. For example, automated methods are becoming more commonplace. This is desirable and indeed essential for industries where arge 'volumes' of materials and/or products have to e checked for microbial contamination. However, modern methods have limitations (e.g. expensive apparatus and *trained* operators/interpreters), whereas some reliable conventional procedures can be very economic and give results which can indicate more than one feature. Too often conventional microbiology has been applied directly from one set of organisms to another without due regard to microbial and environmental characteristics.

This paper re-examines some topics (e.g. swabs, enrichment cultures, microscopy and incubation temperatures) which can benefit those investigators working with low budgets, particularly in industries and developing countries.

Title: Bryn C. Hughes

Address: Department of Science
Bristol Polytechnic
Coldharbour Lane
Frenchay, BRISTOL

Abstract

Adenosine triphosphate (ATP) can be assayed quantitatively and rapidly using the light production from the luciferin-luciferase enzyme complex. Although this reaction has optimum conditions for maximal light output (egionic concentrations, pH and temperature), it has been successfully employed in the estimation of the toxic effects of specific heavy metal treatments upon unicellular algal suspensions. In addition, this technique has shown good correlation with other screening methods, when antifouling leachate solutions have been used as the toxic sample. In both studies, a short exposure period of 24 hours was employed; a significant reduction in screening time when compared to existing toxicity testing methods.

ATP estimates have been widely used to determine biomass in various environments. Levels of microbial contamination in DIESO fuel samples have been difficult to quantify, however , preliminary studies have shown that ATP estimates from such fuel samples compare favourably with corresponding plate count determinations.

Title: Experience with Dairy Products with Particular Reference to Impedance Methods

Author: D.W. Matthews

Address: The Nestle Co. Ltd.
Quality Assurance Department
St. George's House
Croydon Surrey
CR9 1NR

Abstract

Bacteria in pasteurised cream and cream desserts, and yeasts in yoghurt, were estimated impedimetrically with a Bactometer 32 instrument. A direct comparison with standard plate counts of impedance detection time was made and a good correlation was found except for counts of less than 100 per gram where sampling error and the type of microbial flora present influence the results. The detection time for various creams and desserts was compared with their keeping quality in storage at a market simulation temperature of 11°C. Products with a shorter detection time (indicating that there are more bacteria present) showed a greater degree of deterioration. The detection time determined at 30°C in the Bactometer correlated quite well with spoilage of the product after storage at 11°C. Impedance estimation gives us a chance to tailor growth media more to the characteristics of the products under examination and thereby estimate the ability of the microbial flora present to spoil the food.

Title: Some Particular Problems of Testing Emulsions

Author: E.C. Hill

Address: University College,
Department of Microbiology,
P.O. Box 97,
Cardiff CF1 1XP

Abstract

A recent innovation to speed up conventional plate counting has been the introduction of the "Spiral Plater". Experience has shown that if metal working emulsions containing preservatives are tested there may be sufficient carry over of the antimicrobial, particularly in the inner whirls of the spiral, to inhibit colony formation. The method then underestimates the total count. One major benefit of "Spiral Plater" counting has been that to isolate the dominant organisms, one need only locate the outer end of the spiral and work inwards, picking off colonies in turn.

A foreseeable advance in controlling microbial spoilage of metal-working emulsions would be the development of an in-line system for detecting microbial contamination and growth. Emulsions present particular difficulties; several methods have been investigated and, with certain reservations, the impedance method selected for development.

Title: Bactec 460 Automated Radiometric Microbiology System

Author: Jayne M. Lewis

Address: Laboratory Impex Ltd.
Lion Road
Twickenham, Middlesex.

Abstract

The Bactec 460 is an automated radiometric microbiology system. It utilizes a culture vial containing 30 ml of a culture medium in which many of the substrates are labelled with a radioactive isotope, carbon-14. These vials are inoculated with a sample and incubated. If microorganisms are present in the sample, they will utilize the substrates and carbon-14 is released. This diffuses into the gaseous layer at the top of the bottle. The Bactec instrument automatically removes this head space gas and examines it for radioactivity, at a rate of one bottle per minute. Applications of the system are being developed to include sterility testing, limit testing, and microbial enumeration.

Title: The Direct Epifluorescence Filter Technique

Author: G.L. Pettipher

Address: National Institute for Research in Dairying Shinfield.
Reading, Berks.

Abstract

The Direct Epifluorescence Technique (DEFT) which was originally developed for milk, is a rapid, sensitive, direct method for enumerating microorganisms using membrane filtration and epifluorescence microscopy. It takes less than 30 minutes to complete, costs less than £0.40 per sample in disposables, and is suitable for milks containing between 0.5×10^4 and 10^8 bacteria per ml. For use on foods a preliminary pre-filtration through a 5µm pore size nylon filter of a 'stomached' suspension is necessary to avoid difficulty caused by debris. With this pre-treatment DEFT can be used for meat, fish, vegetables, cakes, spices and powders with a maximum sensitivity of 0.6×10^5 cells per gram and correlates well with the unfiltered plate count, especially for fresh meat and fish.

Title: Modern Methods for Detecting Microbial Growth on Surfaces.

Author: A.M. Paton

Address: School of Agriculture,
University of Aberdeen,
581 King Street,
Aberdeen, AB9 1UD

Abstract

The increasing availability of the epifluorescence microscope offers excellent opportunities for the rapid and detailed examination of surfaces associated with biodegradation. Using a mixed fluorescent stain containing acridine orange and a cationic optical brightener directly on suitable surfaces or on adhesive tape impressions, fluorescent emissions at either short or long UV wavelengths clearly visualise the fungal or bacterial microflora.

Title: The Detection and Quantification of Fungal Spoilage on Material

Author: Susan Ward

Address: C.L.E.A.R.
Huntingdon Road Laboratories,
Cambridge,
CB3 ODJ

Abstract

Degraded samples of cotton duck and painted/varnished surfaces show fluorescence under UV light corresponding to viable fungal hyphae after being stained with fluorescein diacetate (FDA). This fluorescence can be quantified using a densitometer to scan the sample. By staining liquid cultures of fungi with FDA (replicate flasks being used for dry weight determinations) the fluorescent counts obtained for the degraded samples can be quantified in terms of mg dry weight of fungus.

Degraded plastic and rubber samples show little, if any, viable hyphae, however the pitting and discolouration produced on the surfaces as a result of fungal attack can be measured by a densitometer and used to produce a semi-quantitative estimation of growth which is more accurate and reproducible than current British Standard test ratings for measurement of biodeterioration.

BIODETERIORATION CENTRE
SHORT COURSE PROGRAMME 1982

VC 825 - 5-14 July 1982

Biodeterioration

A comprehensive residential course of lectures, demonstrations, seminars, visits and practical work giving a basic background in many aspects of materials biology. The course, which is based on a previous UNESCO-UNEP sponsored course will be of benefit to postgraduate biologists and industrialists in biological industries, such as biocide manufacturers and consulting scientists.

Cost: including full board residential accommodation - £250.00

NOTE: *Some sponsored places may be available to students from Developing Countries!*

VC 826 - 27 (& 28) September 1982

Moisture in Materials

Problems caused by moisture in materials and subsequent biological effects will be covered, together with techniques for monitoring and measurement. A second day on identification of spoilage fungi is planned as an optional extra.

Cost: including lunch and refreshments - £35.00

Identification course including overnight accommodation - £50.00 extra

VC 827 - 12 October 1982

Chemical Preservation of Materials

Lectures on various aspects of chemical preservatives for both solid and liquid systems will be given and there will be a commercial exhibition by manufacturers. This course will be held either at the Biodeterioration Centre or in a hotel in the Midlands.

Cost: including lunch and refreshments to be announced but probably in the region of £50.00

VC 828 - 26 October 1982

Toxins in Food and Feedstuffs

The course will concern itself with toxic agents of biological origin in both human and animal foodstuffs. Special emphasis will be given to Mycotoxins.

Cost: including lunch and refreshments - £35.00

VC 829 - 9 November 1982

Weed Control

Various aspects of weed control (physical, chemical and biological) will be considered both in agricultural and amenity situations. Of interest to agriculturalists, local authorities and building conservators.

Cost: including lunch and refreshments - £35.00

All courses, unless otherwise stated, are held at the Biodeterioration Centre. **Further details of courses and booking forms may be obtained from:**

Dr D Allsopp, Course Organiser, Biodeterioration Centre, University of Aston in Birmingham, St. Peter's College, College Road, Saltley, Birmingham B8 3TE.

Telephone: 021-328-5950 Telex: 336997 *(Mark for attention Biodeterioration Centre)*

The Centre reserves the right to amend this programme and to cancel any courses should there be insufficient support to run them economically.

THE BIODETERIORATION SOCIETY

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.....

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Mrs. Joan Maw,
Secretary, The Biodeterioration Society
C. P. Snow Building,
The Hatfield Polytechnic,
P.O. Box 109
HATFIELD Herts.
AL10 9AB

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